

CLAIMS

1. An optical device comprising:

an optical source for pumping input optical radiation centered around an input wavelength; and

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at least one adjustable output coupler, coupled with the optical source, for controlling the input optical radiation at one or more output wavelengths.

2. The optical device of Claim 1, wherein the at least one adjustable output coupler has a variable reflectivity.

10 3. The optical device of Claim 2, wherein the reflectivity of the at least one adjustable output coupler varies in response to applying stress, heat or electrical power.

4. The optical device of Claim 3, wherein the reflectivity of the at least one adjustable output coupler varies in response to a control signal.

15 5. The optical device of Claim 3, further comprising:

at least one set of optical gratings, each optical grating of the set converting the pumped optical radiation to wavelengths greater than or equal to the input wavelength.

6. The optical device of Claim 5, wherein each optical grating of the set comprises a chirped or an unchirped design, and the output wavelengths are greater than the input wavelength.

7. The optical device of Claim 6, wherein each optical grating of the set has a reflectivity of about one-hundred percent or less.

8. A cascaded Raman resonator comprising
an optical source for pumping optical radiation centered around an input wavelength;

at least one set of optical gratings for converting the pumped optical radiation to wavelengths other than the input wavelength; and

at least one adjustable output coupler for controlling the power of the optical radiation propagating from the at least one set of optical gratings at the wavelengths other than the input wavelength.

9. The cascaded Raman resonator of Claim 8, wherein the at least one adjustable output coupler has a variable reflectivity.

10. The cascaded Raman resonator of Claim 9, wherein the reflectivity of the at least one adjustable output coupler varies in response to applying stress, heat
5 or electrical power.

11. The cascaded Raman resonator of Claim 10, wherein the reflectivity of the at least one adjustable output coupler varies in response to a control signal.

12. The cascaded Raman resonator of Claim 10, wherein each optical grating of the at least one set comprises a chirped or an unchirped design, and wherein
10 the wavelengths other than the input wavelength are greater than the input wavelength.

13. The cascaded Raman resonator of Claim 12, wherein each optical grating of the at least one set has a reflectivity of about one-hundred percent or less.

14. The cascaded Raman resonator of Claim 12, wherein the at least one set
15 of optical gratings and the at least one adjustable output coupler are written into or spliced onto an optical waveguide.

15. A multi-wavelength cascaded Raman resonator comprising:

an optical source for pumping optical radiation centered around an input wavelength; and

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a Raman optical fiber comprising:

at least a first set of optical gratings for converting the pumped optical radiation to wavelengths other than the input wavelength; and

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at least one adjustable output coupler having a variable reflectivity for controlling the power of the optical radiation propagating from the at least one set of optical gratings at the wavelengths other than the input wavelength.

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16. The multi-wavelength cascaded Raman resonator of Claim 15, wherein the reflectivity of the at least one adjustable output coupler varies in response to applying stress, heat or electrical power.

17. The multi-wavelength cascaded Raman resonator of Claim 16, further comprising at least a second set of optical gratings for converting the pumped optical radiation to wavelengths other than the input wavelength.

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18. The multi-wavelength cascaded Raman resonator of Claim 17, wherein each optical grating of the at least first and second sets comprise a chirped or an unchirped design, and wherein the wavelengths other than the input wavelength are greater than the input wavelength.

5 19. The multi-wavelength cascaded Raman resonator of Claim 18, wherein each optical grating of the at least first and second sets has a reflectivity of about one-hundred percent or less.

10 20. The multi-wavelength cascaded Raman resonator of Claim 19, wherein the at least first and second sets of optical gratings and the at least one adjustable output coupler are written into or spliced onto the Raman optical fiber.